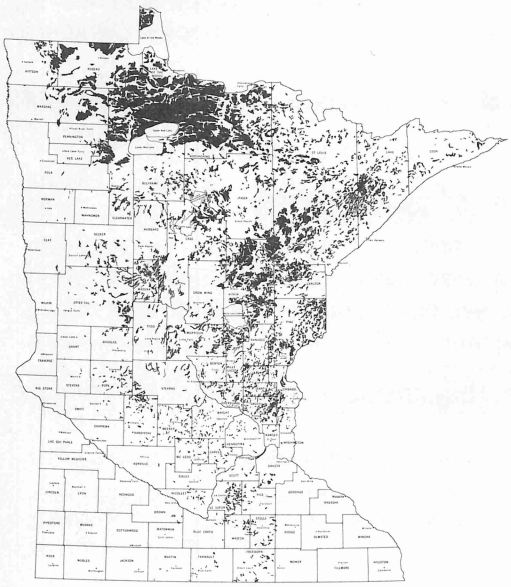
# MAJOR PEAT RESOURCES OF MINNESOTA





MLMIS

MINNESOTA LAND MANAGEMENT INFORMATION SYSTEM

Center for Urban and Regional Affairs
University of Minnesota

Minnesota State Planning Agency

## PEAT IN MINNESOTA

The depletion of domestic petroleum reserves and the increased dependence on foreign supply has stimulated interest in the utilization of new energy resources.

Peat is one energy source which is currently being considered. Peat has been used extensively in Europe for agriculture and as a fuel source for many generations. However, in the United States peat has been used far less intensively. While some peat is utilized in agricultural and horticultural industries, most of the resource remains unexploited.

Minnesota has over seven million acres of peat lands with the major deposits located in the northern sector. These reserves represent seven billion tons of peat, equal to one half of the United States' total supply. Because of this tremendous energy potential, and because of Minnesota Gas Company's recent lease request for exploration on about 300,000 acres of state owned land, it is imperative that an inventory of this resource be conducted. Currently, a number of state agencies are evaluating the energy potential of Minnesota peat.

### Regional Planning Information

The accompanying maps have been produced by the Minnesota Land Management Information System (MLMIS). They provide the following information about Minnesota's peat resource:

–Where the major peat deposits are located and how many acres they comprise.

–The ownership pattern and acreage in each ownership group.

The MLMIS is well equipped to answer questions regarding Minnesota's peat resource, especially questions that require information from separate sources. MLMIS uses 40 acre data cells to store resource information. Each cell represents a parcel of land with fixed dimensions that can be geographically located on the ground. Physical and cultural information is taken from maps, tables, and documents and stored in the appropriate data cells. Using its computerized data bank, MLMIS is capable of recalling and synthesizing information in both map and tabular form.

Three study areas have been selected to demonstrate the utility of the MLMIS data for inventorying peat resources.

## LAND OWNERSHIP

Thirty-three classes of land ownership are currently stored on the MLMIS files. Most of the data were made available to the MLMIS by the Minnesota Department of Natural Resources (DNR). The DNR maintains land records for state owned and county owned or administered land. Information on federally owned land was obtained from the individual federal agencies involved. The thirty-three ownership classes were organized into four principal ownership groups:

1. Federal: This group includes primarily lands in Voyageurs National Park, National Forests, National Wildlife Refuges and Bureau of Indian Affairs holdings.
2. State: This group is primarily State Forest lands.
3. County: This group includes all tax-forfeited lands, plus lands owned by the counties.
4. Private: All remaining lands.

## SOIL SURVEYS USED IN THE PEAT RESOURCES MAPS

The MLMIS has collected soil information from two principal sources. They are the Minnesota Soil Atlas and the Arrowhead Region soil survey.

### Minnesota Soil Atlas

The Minnesota Soil Atlas is a cooperative project conducted by the Department of Soil Science, University of Minnesota, and the U.S. Soil Conservation Service. The Atlas provides basic soil information for broad land use planning purposes. It is not intended to replace the more detailed county soil survey reports,[†] but rather to provide necessary soil information until the surveys can be completed. Where available, SCS surveys have been utilized in the development of the Minnesota Soil Atlas.

The Minnesota Soil Atlas consists of generalized soil maps and accompanying bulletins which provide information concerning the nature and character of the soil. The Atlas maps, called sheets, are being published at a scale of 1:250,000. This scale is consistent with one series of U.S. Geological Survey topographic maps. The State of Minnesota will be covered by eleven Atlas sheets. To date, three sheets have been published covering parts of north central Minnesota, and the eight remaining are in final mapping stages. One additional map, the Twin Cities Sheet, which covers the Minneapolis-St. Paul seven county metropolitan area, has been added to the original Atlas list. This sheet is published at a scale of 1:125,000 to provide more detailed information on this highly developed urbanized area.

The mapping unit designed for use in the Atlas series is called the soil landscape unit. This unit is designed to help the user with a minimum knowledge of soils to readily understand the basic properties of the mapped soils such as soil texture, drainage conditions and soil color (a reflection of accumulated organic matter). The smallest area delineated in the Atlas is approximately 600 acres.

In addition to the soil landscape unit itself, the Atlas identifies the specific physiographic entity upon which soil landscape units have evolved. These entities are termed *geomorphic regions.* Geomorphic regions are the topographic settings and constitute the parent material for soil development.

### Arrowhead Region Soil Survey

The Arrowhead Region soil survey was conducted by the U.S. Soil Conservation Service (SCS) under contract with the Arrowhead Regional Development Commission. SCS mapped the soil associations[‡] for the Arrowhead Region in 1973 and spring of 1974. Soil associations were identified from 1969 1:90,000 high altitude imagery of northeast Minnesota. Only limited field checking was undertaken to verify the character and boundaries of associations. Although the scale of this survey is smaller (1:62,000) than the county surveys more commonly prepared by the SCS (1:15,000-20,000), the methods used and associations identified are the same.

In most cases, associations consist of known soil series. However, soil descriptions and interpretations were developed for some soils units different from already established series. Generally, the smallest soil unit identified on Arrowhead survey maps is approximately 160 acres. Organic (peat) soils pose a minor exception, since peat lands are so easily distinguished on air photos. Deposits of these smaller than 160 acres were usually mapped.

## DISTRIBUTION AND OWNERSHIP OF PEAT RESOURCES

Figure 1 shows the distribution of the peat resources in Minnesota and the three MLMIS study areas. The most extensive peat lands are in the northern and north central parts of the State, principally in the large glacial lake basins. Eight counties—Aitkin, Lake of the Woods, St. Louis, Koochiching, Beltrami, Itasca, Marshall and Roseau—contain well over half of this resource. In addition, these counties contain most of the peat with highest and moderate energy potential. Three large study areas were selected because of the concentration of potential energy peat. Koochiching County was the pilot demonstration use of MLMIS data to compare peat resources with public land ownership. The second study area—in the south-central portion of the Arrowhead Region—encompassed the major peat concentrations of St. Louis, Itasca, Aitkin and Carlton counties. The third study area included all of Lake of the Woods County and the northern half of Beltrami county.

[†] These surveys are published cooperatively by the Minnesota Agricultural Experiment Station and the Soil Conservation Service.

[‡] Soil Association: A group of defined and named soil units that occur in an individual geographic pattern. The soils in an association may be derived from the same kind of parent material and be similar in characteristics, or they may be derived from different kinds of parent material and be dissimilar in characteristics.

Within these three study areas, MLMIS enabled description of the location, acreage, and ownership of the peat resource in Minnesota. The maps in each of the three study reports show the location of all peat resources, including peat with energy potential. The estimated acreage of potential peat in each study area was:

| | Highest Potential | Moderate Potential |
|---|---|---|
| Koochiching County | 523,000 acres | 425,920 acres |
| Southern Arrowhead | 502,800 acres | 502,600 acres |
| Northern Headwaters | 418,520 acres | 488,880 acres |
| Total in 3 areas | 1,444,320 acres | 1,417,400 acres |

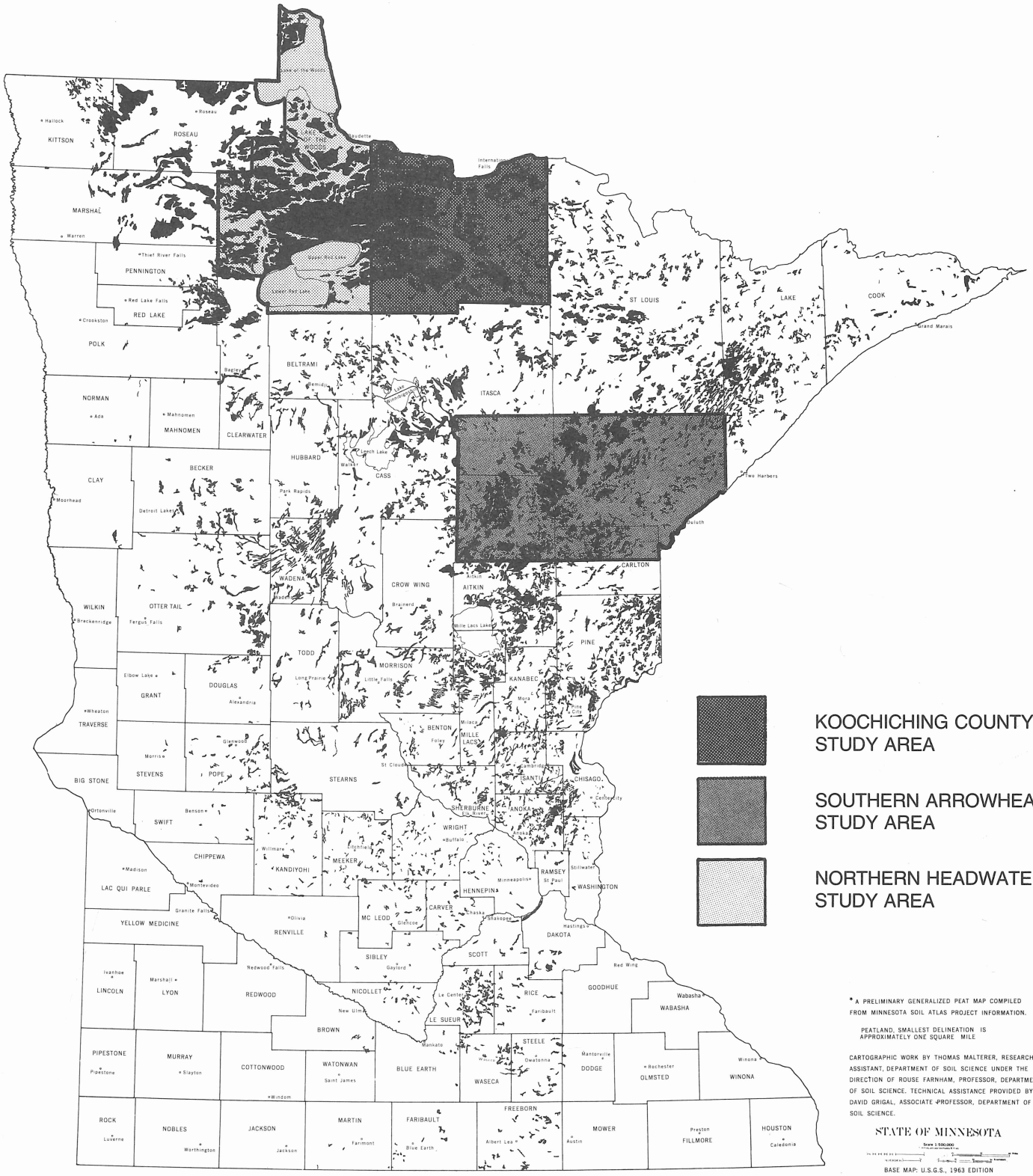
Thus, these three study areas contain nearly three million acres of peat with some energy potential. The three study areas contain a sizable proportion of the energy peats in Minnesota. They also contain approximately half of the estimated six million acres of peat with energy potential found in the Upper Great Lakes States of Minnesota, Wisconsin, and Michigan.

The following summarizes ownership of highest and moderate potential energy peat in the three study areas:

| | Highest Potential | | Moderate Potential | |
|---|---|---|---|---|
| State | 773,080 | 54% | 888,600 | 63% |
| Federal | 161,040 | 11% | 177,160 | 12% |
| County | 248,040 | 17% | 166,360 | 12% |
| Private | 262,160 | 18% | 185,280 | 13% |
| Total in 3 areas | 1,444,320 | 100% | 1,477,400 | 100% |

The State of Minnesota is the dominant owner of the potential energy peats. The State owns 54% of the highest potential peat in these threee areas. Nearly 90% of this peat is in the Koochiching and northern Headwaters study areas. The State also owns 63% of all of the moderate energy potential peats in these three study areas with the acreage evenly split among the three study areas. Of the remaining energy peat, the federal government owns a sizable portion in the northern Headwater area. The county and private ownerships are most prominent in the southern Arrowhead study area.

# PEAT RESOURCES IN MINNESOTA




* A PRELIMINARY GENERALIZED PEAT MAP COMPILED FROM MINNESOTA SOIL ATLAS PROJECT INFORMATION.

PEATLAND, SMALLEST DELINEATION IS APPROXIMATELY ONE SQUARE MILE

CARTOGRAPHIC WORK BY THOMAS MALTERER, RESEARCH ASSISTANT, DEPARTMENT OF SOIL SCIENCE UNDER THE DIRECTION OF ROUSE FARNHAM, PROFESSOR, DEPARTMENT OF SOIL SCIENCE. TECHNICAL ASSISTANCE PROVIDED BY DAVID GRIGAL, ASSOCIATE PROFESSOR, DEPARTMENT OF SOIL SCIENCE.

STATE OF MINNESOTA

Scale 1:500,000

BASE MAP: U.S.G.S., 1963 EDITION